VII CONGRESO NACIONAL DE NANOTECNOLOGÍA
12 AL 15 DE NOVIEMBRE 2023
PUCÓN, CHILE

Graphene based electrodes for efficient supercapacitors

Dinesh Pratap Singh
Department of Physics and Millennium Institute for Research in Optics (MIRO), Universidad de Santiago de Chile Av. Victor Jara, Santiago 3493, Chile

Leonardo Vivas
Department of Physics and Millennium Institute for Research in Optics (MIRO), Universidad de Santiago de Chile Av. Victor Jara, Santiago 3493, Chile

Adrian Jara Cornejo
Department of Physics and Millennium Institute for Research in Optics (MIRO), Universidad de Santiago de Chile Av. Victor Jara, Santiago 3493, Chile

Graphene [1]; the first ever thinnest material known and universally established as a wondrous material, keep on surprising by its noble and astounding properties, various recent and forthcoming applications based on it´s remarkable high surface area, excellent thermal conductivity, superior mechanical properties, ultra-high electron mobility etc. Owing to high surface area and high electronic and ionic conductivity, it is considered as an efficient material for the electrodes of energy conversion and storage devices. In the energy sector, renewable energy conversion is being achieved by the solar cell devices but simultaneously their storage in an efficient, durable, and low-cost technique is in utmost demand for uninterrupted continuous 24hrs power supply to fulfill energy requirement [2]. Recently developed electrochemical double layer capacitor (EDLC) or supercapacitors are benefitted over commercially available lithium ¡ion batteries in various sense such as ecofriendly, fast charging, high power density, instant power delivery, high capacity retention and long cyclic stability etc. Graphene based composites with metals and transition metal oxides can be the suitable candidates for the electrode material and efficient energy storage with low cost of production. Here we will talk about in-situ and ex-situ synthesis approaches for graphene-based materials and it´s utilization as an electrode for supercapacitor. Synthesis of graphene-based composites such as rGO-Au [3] and graphene-chromium oxide [4] etc. and their application as an electrode material for high performance supercapacitors with high energy and power densities and long cyclic life will be discussed and described during the presentation.

Acknowledgments

The authors acknowledge with gratitude the financial supports from ANID-Millennium Science Initiative Program ICN17–012 through Millennium Institute for Research in Optics (MIRO), ANID- Fondecyt Postdoctorado 3210225 and ANID-Fondecyt Regular 1231714.

References

[1] Geim A. K. et al. (2007), doi.org/10.1038/nmat1849
[2] Kumar R. et al. (2018), doi.org/10.1016/j.pecs.2018.03.001
[3] Vivas L. et al. (2022), doi.org/10.3389/fenrg.2021.794604
[4] Vivas L. et al. (2022), doi.org/10.1021/acsomega.2c05670